8. Cell Biology and Bio-technology

Question 1.
Fill in the blanks and complete the statements.
a. Methods like artificial insemination and embryo transplant are mainly used for .....
(a) animal husbandry
(b) wild life
(c) pet animals
(d) for infertile women
Answer:
(a) animal husbandry

b. ..... is the revolutionary event in biotechnology after cloning.
(a) Human genome project
(b) DNA discovery
(c) Stem cell research
(d) All the above
Answer:
(c) Stem cell research

c. The disease related with the synthesis of insulin is .....
(a) cancer
(b) arthritis
(c) cardiac problems
(d) diabetes
Answer:
(d) diabetes

d. Government of India has encouraged the ..... for improving the productivity by launching NKM-16.
(a) aquaculture
(b) poultry
(c) piggery
(d) apiculture
Answer:
(a) aquaculture

Question 2.
Match the pairs.

Column 'A'	Column 'B'
(1) Interferon	(a) Diabetes
(2) Factor VIII *	(b) Dwarfness
(3) Somatostatin	(c) Viral infection
(4) Interleukin	(d) Cancer
	(e) Haemophilia

Answer:
(1) Interferon – Viral infection
(2) Factor VIII – Haemophilia
(3) Somatostatin – Dwarfness
(4) Interleukin – Cancer

Question 3.
Rewrite the following wrong statements after corrections:
a. Changes in genes of the cells are brought about in non-genetic technique.
Answer:
Non-genetic biotechnology involves use of either cell or tissue.

b. Gene from Bacillus thuringiensis is introduced into soyabean.
Answer:
Gene from Bacillus thuringiensis is introduced with gene of cotton.

Question 4.
Write short notes.
a. Biotechnology: Professional uses. (Commercial uses)
Answer:
Biotechnology is the branch of biology that involves application of technology in utilising the living organisms or their parts to produce products useful for humans. There are various applications of biotechnology some of which are mentioned below:

(i) It is used in agriculture to produce improved varieties of plants and animal breeds, and to control pests and pathogens.

(ii) It is applied in food processing industries to produce additives.

(iii) It is applied to produce biocatalysts and biopolymers.

(iv) Many biotechnological processes are applied to control pollution and treat waste water.

(v) It is applied in the field of health care to produce several vaccines, drugs and hormones like insulin, etc.

b. Importance of medicinal plants.
Answer:

- In Ayurveda practices, the natural remedies were used. Since India had great biodiversity and traditional knowledge of herbal medicinal uses, therefore, people depended on such medicinal plants.
- In olden days, such herbs were collected by roaming in the jungles.
- Such important medicinal herbs are now cultivated with care.
- In entire world people have understood the importance of holy basil (tulsi), Adulsa, Jyesthmadh, etc.
- In some of the allopathy medicines too, the plant extracts are used.
- Medicines made from harmful chemicals have side effects and are not safe to be used unless there is medical supervision. Therefore, world-wide herbal remedies are gaining more popularity.

Question 5.
Answer the following questions in your own words.
a. Which products produced through biotechnology do you use in your daily life?
Answer:

There are various products which we use in our daily life that are produced by biotechnological processes. These products belong to the category of:

- Medical products like antibiotics, vaccines and insulin.
- Fruits and dairy products.
- Microbial metabolites like vitamins and enzymes.
- Organic acids like acetic acid/vinegar.

b. Which precautions will you take during spraying of pesticides?
Answer:

- Pesticides are toxic chemicals. By using them indiscriminately, they contaminate the water, soil and also crops.
- The D.D.T., chloropyriphos and malathion are very dangerous. They spread through the food chain causing biomagnification.
- Therefore, we shall not use such insecticides and pesticides. We shall use organic pesticides. Excessive use will be avoided.
- At the time of spraying, nose, eyes and skin will be covered and protected.
- Care will be taken not to allow children or domestic animals to come in, contact with a pesticide.

c. Why some of the organs in human body are most valuable?
Answer:

- The body can be in best health,if all the vital organs of the body are also in the best condition.
- Brain, kidney, heart, liver, etc. are some such vital organs which are most essential for proper metabolism and functioning of the body. The sense organs of the body are also of utmost importance, especially eyes.
- One cannot survive if any of these vital organs are not functioning properly. Some of the organs like brain will never regenerate too.
- Some of the organs can be brought back to functionality by performing surgeries. However, any problem with these vital organs make life miserable, therefore, they are said to be valuable.

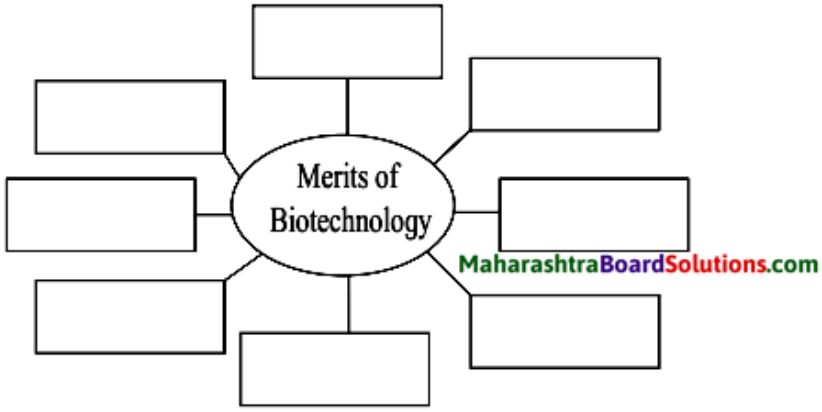
d. Explain the importance of fruit processing in human life?
Answer:

Fruits are something which we eat everyday. Fruits are called perishable products which means that they cannot be stored for long durations. The solution to this problem is fruit processing. Fruit processing is a process which converts fruits into jams, juices, jellies etc. These processing methods include storage in cold areas, drying salting etc. This process makes the fruits available all around the year and makes their storage possible.

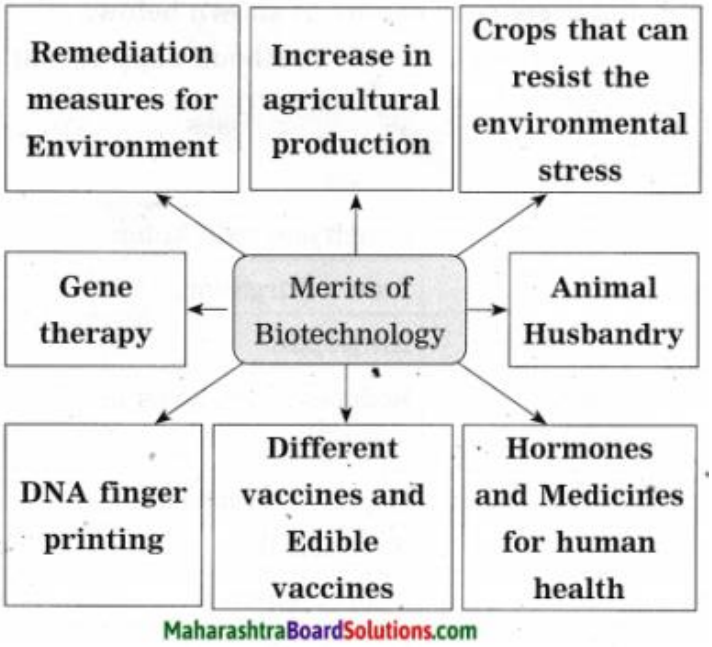
e. Explain the meaning of vaccination.
Answer:

- Vaccination is the administering of vaccine. Vaccine is the 'antigen', given to a person or even to animals for acquiring immunity against particular pathogens or diseases.
- In olden days, vaccipes were prepared with the help of completely or partially killed pathogens. But this method causes some inconvenience. Some persons were allergic to such raw vaccines or they contracted the same disease through such vaccines.
- Hence in recent times the vaccines are produced by using biotechnology. These vaccines are artificial which are synthesised in the laboratories.
- The antigen is produced with the help of gene of the pathogen. Such vaccine becomes safe for administering.
- These antigenic proteins are injected to people to make their immune systems strong. This process of vaccination is absolutely safe. The vaccines are more thermostable and active for a long period of time.

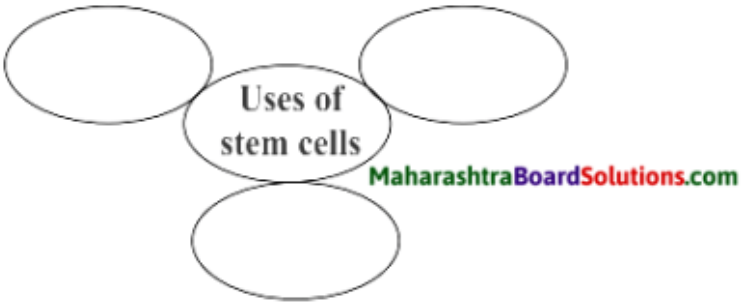
Question 6.
Complete the following chart.



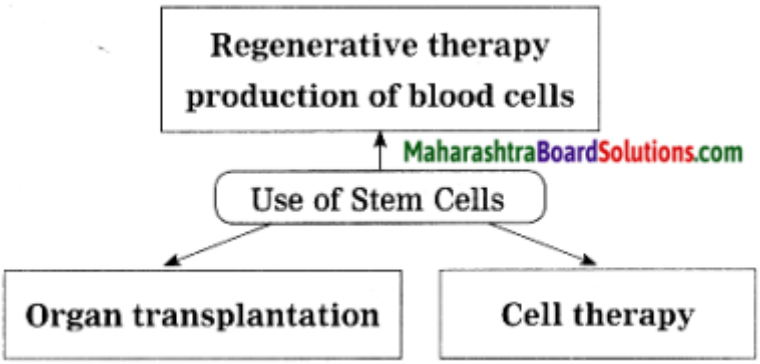
Answer:



Question 7.
Write the correct answer in blank boxes.



Answer:



Question 8.
Identify and complete the following correlations:
a. Insulin : Diabetes : : Interleukin : .....
Answer:
Insulin : Diabetes : : Interleukin : Cancer

b. Interferon : ..... : : Erythropoietin : Anaemia.
Answer:
Interferon : Viral infection : : Erythropoietin : Anaemia.

c. ..... : Dwarfness : : Factor VIII : Haemophilia.
Answer:
Somatostatin : Dwarfness : : Factor VIII : Haemophilia.

d. White revolution : Dairy : : Blue revolution : .....
Answer:
White revolution : Dairy : : Blue revolution : Fishery

Question 9.
Write a comparative note on usefulness and harmfulness of biotechnology.
(OR)
"Biotechnology is not only beneficial but it has some harmful effects too". Express your opinion about this statement.
Answer:
Merits of biotechnology:

- it has helped in the field of agriculture for the development of stress resistant varieties for example drought resistant, temperature resistant plants etc.
- it has been useful in the medical field in the diagnosis and treatment of various kind of diseases.
- it is being widely applied in the food industry for producing different kinds of food products on a larger scale.
- it's potential for solving environmental problems is also being exploited. For examples, microorganisms are being used to solve the menace of plastics.

Demerits of biotechnology

Although biotechnology has found a widespread applications in various field, it has its own potential risks. Some of its demerits are:

- some of the biotechnological procedures are against nature and natural laws as they involve other living organisms and disturbing their genetic makeup.
- new and advanced varieties of crops produced by biotechnology, which are considered to be healthier and better, also have some disadvantages like seed sterility.
- it may also lead to the development of antibiotic resistant bacteria
- there are various ethical issues associated with products produced by biotechnological processes.